



# WORKING GROUP ON BUILDING ENERGY DISCLOSURE

RATING BACKGROUND & TECHNICAL GROUNDING

August 12, 2011



Richard Faesy, Energy Futures Group

# Overview

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- Background for Richard Faesy
- Why disclosure is important
- Scope
- Some terms and concepts
- History of ratings/labeling/disclosure
- Rating and labeling examples
- Vermont's experience and infrastructure

# Background for Richard Faesy

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- Principal at Energy Futures Group (EFG) of Hinesburg since May 2010
- Previously: 20+ years at Vermont Energy Investment Corp. (VEIC)
  - Energy Efficiency Division Manager within Consulting Group
- Founding Board Member of RESNET 1995-2010
- Started Vermont's Home Energy Rating System in 1986

# Labeling of Cars & Appliances

Compare this vehicle to others in the **FREE FUEL ECONOMY GUIDE** available at the dealer.

**CITY MPG**  
**23**

Actual Mileage will vary with options, driving conditions, driving habits and vehicle's condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between 19 and 27 mpg in the city and between 26 and 35 mpg on the highway.

**Fuel Economy Information**

1993 CANARY 2.0 LITER  
L4 ENGINE FUEL INJECTED  
AUTO 3 SPD TRANS CATALYST  
FEEDBACK FUEL SYSTEM

Estimated Annual Fuel Cost:  
**\$850**

**HIGHWAY MPG**  
**30**

For Comparison Shopping, all vehicles classified as **COMPACT** have been issued mileage ratings ranging from 1 to 31 mpg city and 16 to 41 mpg highway.

Based on standard U.S. Government tests

# ENERGYGUIDE

Whirlpool Corporation  
Model: ET15HE1M01  
GT15HE1M01

Refrigerator-Freezer  
With Automatic Defrost  
With Top-Mounted Freezer  
Whirlpool Through-The-Door for Service  
Capacity: 20.9 Cubic Feet

**Compare the Energy Use of this Refrigerator with Others Before You Buy.**

<b>This Model Uses</b> 442 kWh/year		<b>ENERGY STAR®</b> A symbol of energy efficiency
<b>Energy use (kWh/year) range of all similar models</b>		
<b>Uses Least Energy</b> 457		<b>Uses Most Energy</b> 530
<small>The Estimated Annual Energy Consumption of this model was not available at the time the range was published.</small>		

**kWh/year (kWh/year) (kWh/year)** is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 20.5 to 22.4 cubic feet and the above features are used in this scale.

**Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:**

**\$37**

Based on a 2001 U.S. Government national average cost of 8.29¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Copyright © 2001 Whirlpool Corporation. All rights reserved. Whirlpool Corporation is a registered trademark of Whirlpool Corporation.

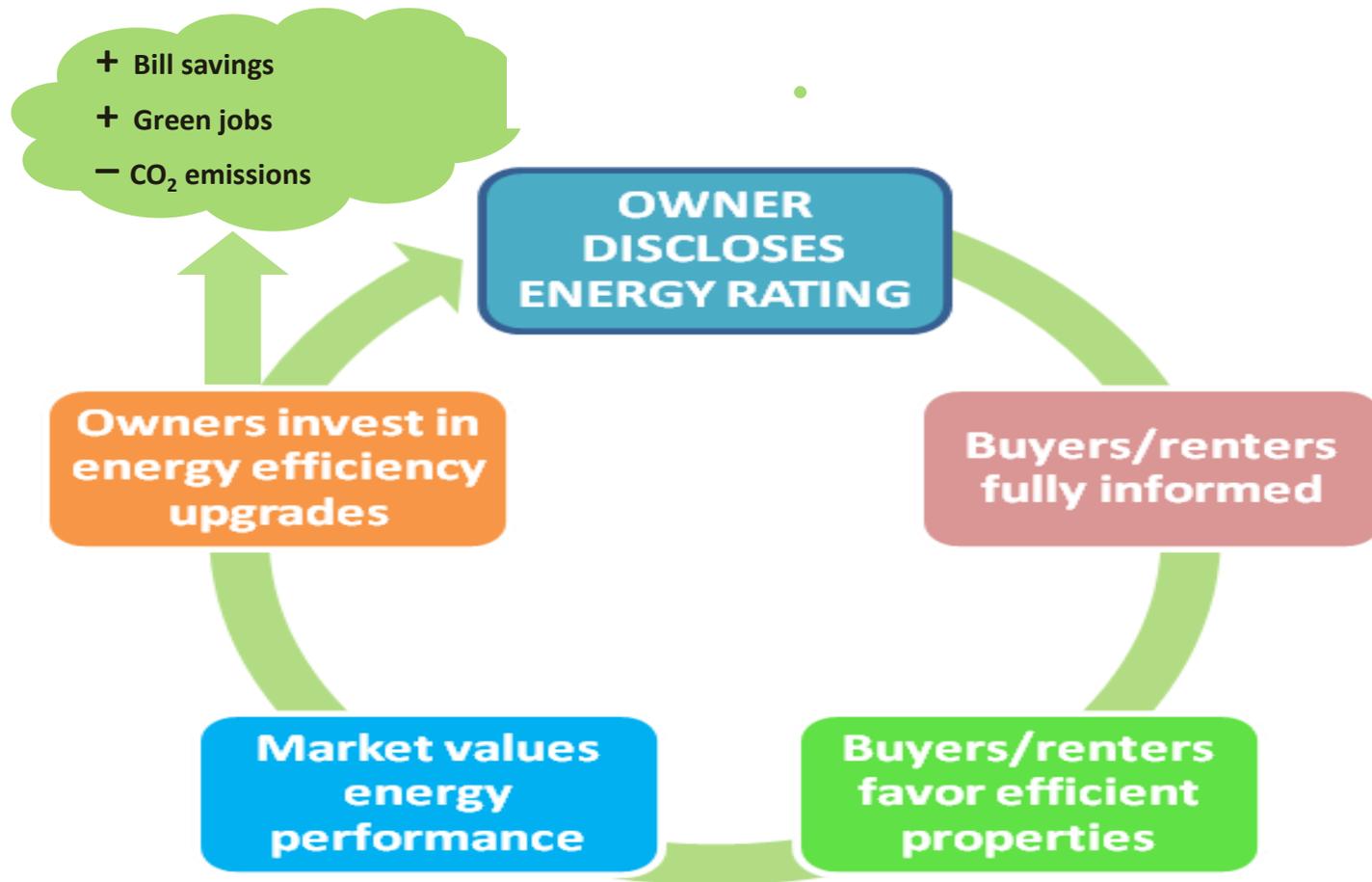
# Why is disclosure important?

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1. Creates an “MPG sticker” for buildings
2. Protects buyers and lenders by providing disclosure of energy costs
3. Protects sellers who have invested in energy improvements to their buildings
4. Delivers economic benefits to Vermont by stimulating demand for contractors reducing energy costs by as much as \$800 million over 20 years
5. Supports Vermont’s goal of upgrading 80,000 homes by 25% by 2020

# Building Energy Labeling Cycle

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# Scope

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- Residential & Commercial
- New Construction & Existing Buildings
  - Code compliance
  - Time of transaction
  - Periodic reporting
- Government Buildings (?)
  - Some jurisdictions require regular state & municipal building reporting to encourage efficiency progress over time and accountability to taxpayers

# Terms & Concepts

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- **Audit:**
  - RESNET and Building Performance Institute (BPI) have standards
  - Information collection, analysis and reporting requirements by certified auditor
  - No quantification presented for house-to-house comparisons
- **Rating:**
  - *Comparative* energy performance assessment
  - “Home Energy Rating System”, or HERS, is not the only “rating”
  - “Scorecard”, “Energy Performance Score”, etc.
- **Label:** Presentation of rating results

# Terms & Concepts con't

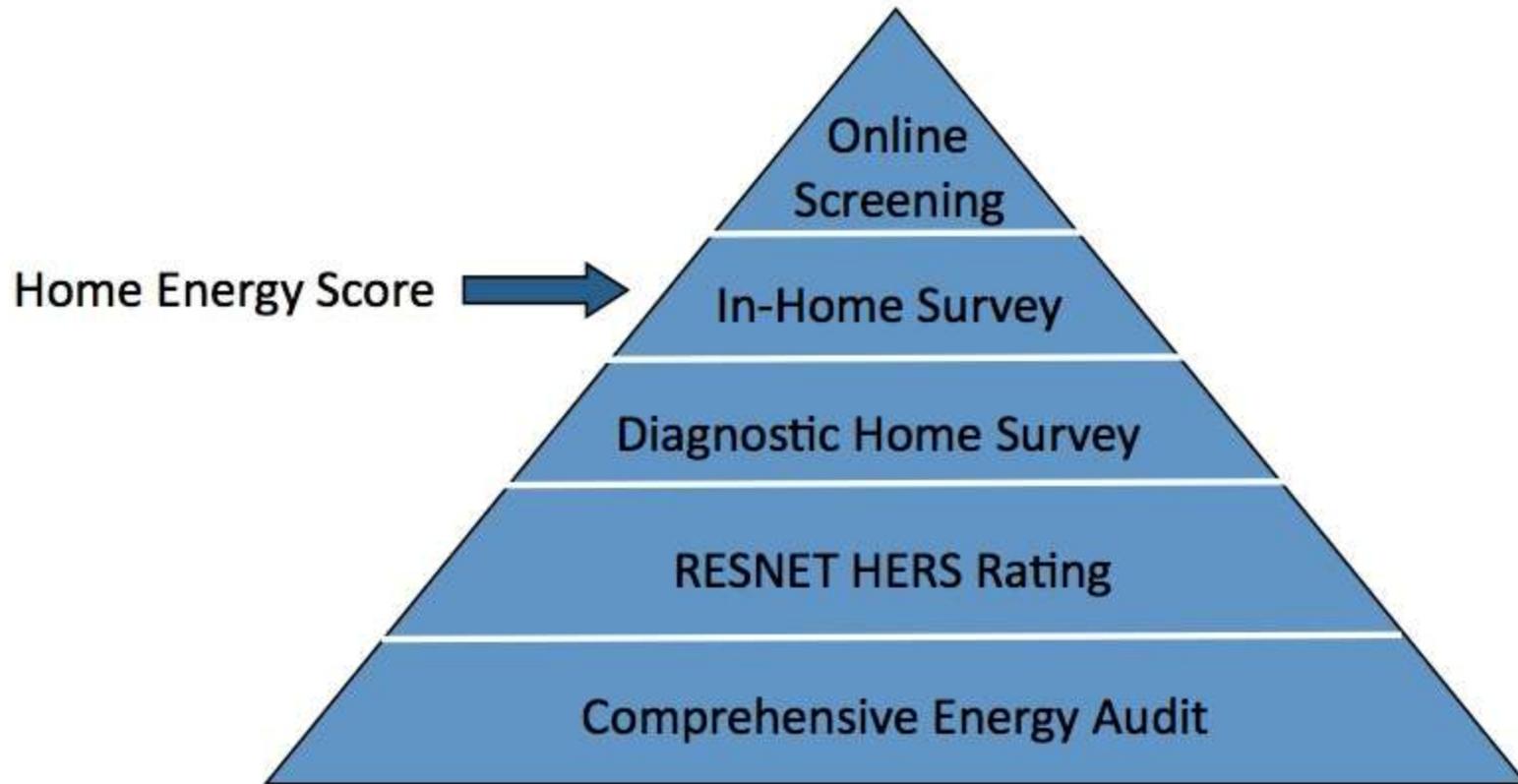
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- **Asset rating:** Comparative energy performance assessment of a building's structural components based on building features and simulated operating conditions.
- **Operational rating:** Comparative energy performance assessment of a building based on actual energy consumption and operating conditions, typically normalized for climate, occupancy, operating hours, floor area and other factors.
- **Site Energy vs. Source Energy:** Customer side “of the meter” vs. from extraction and utility

# Hierarchy for “Rating Tools”

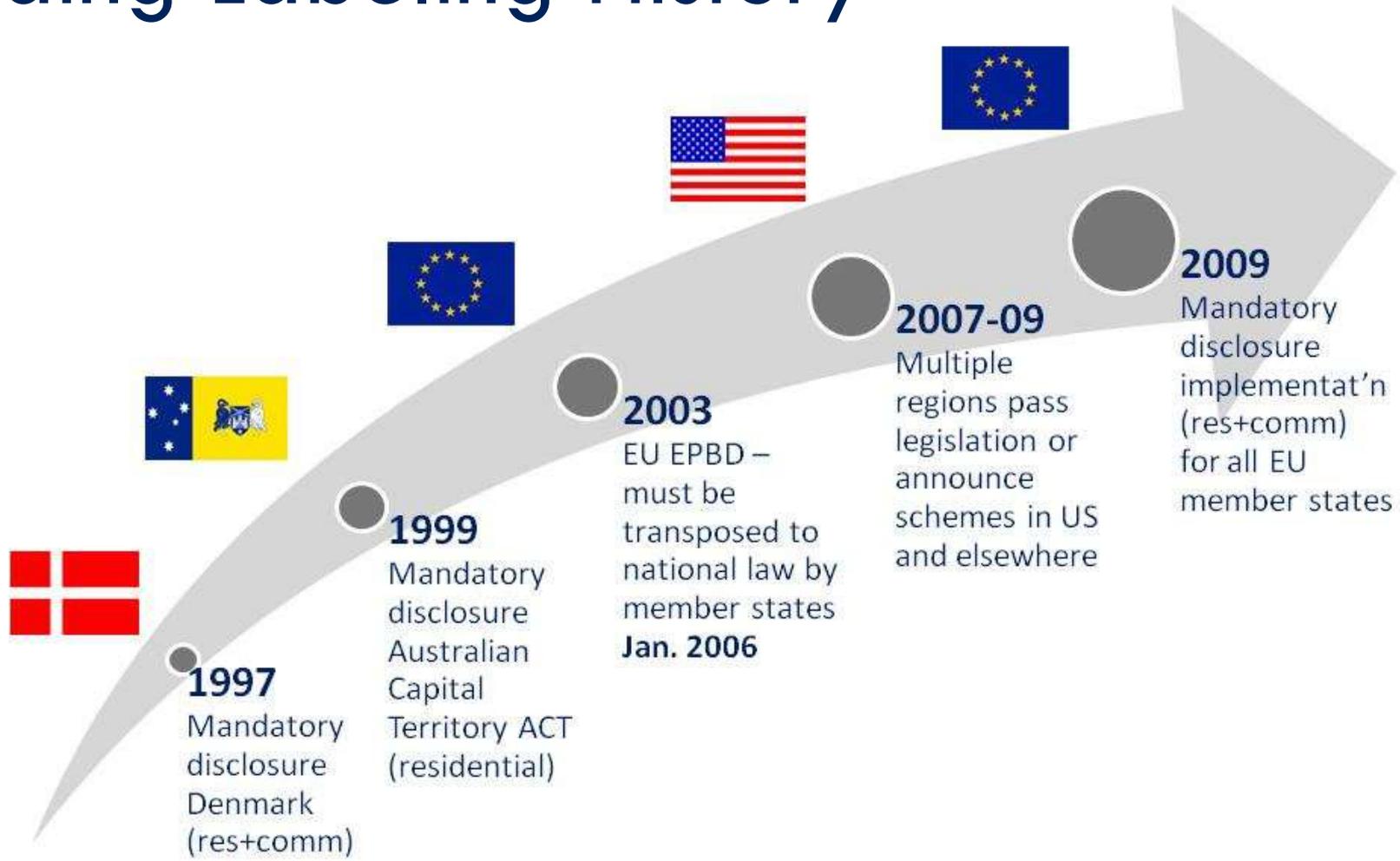
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## HEST vs. HERS Granularity

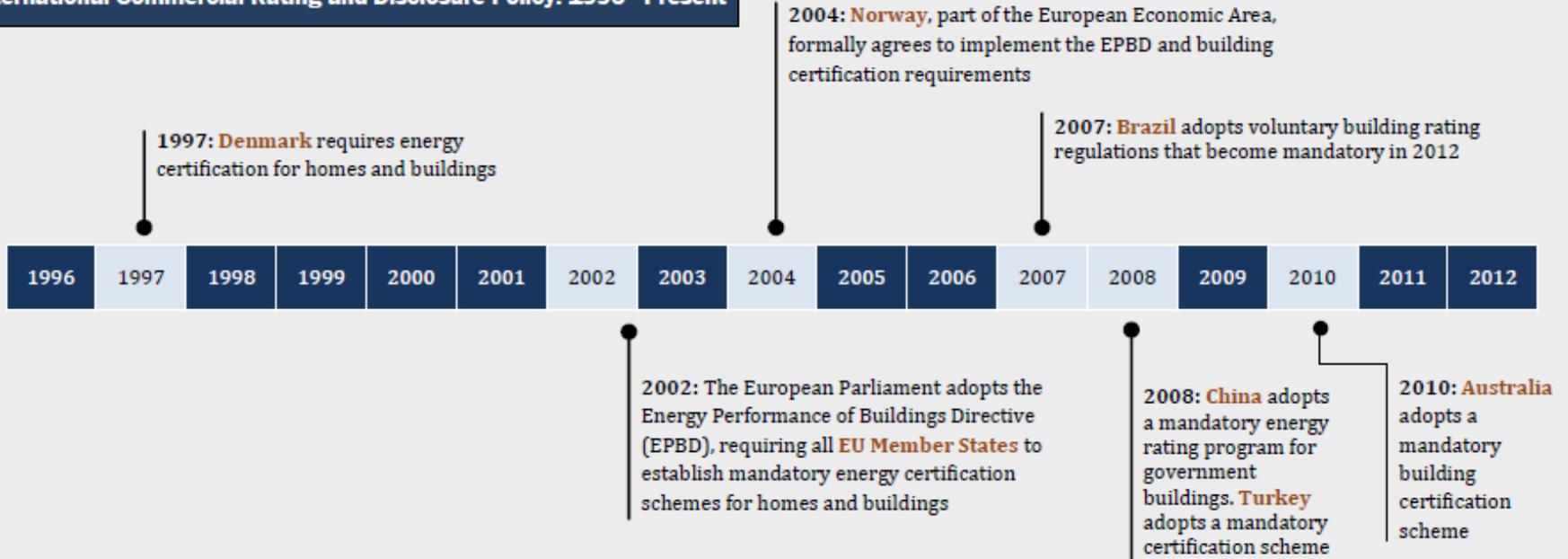


*Time of Sale Energy Labeling of Homes: A Concept Paper, Philip Fairey (FSEC), Home Energy Magazine, July 2010 Issue.*

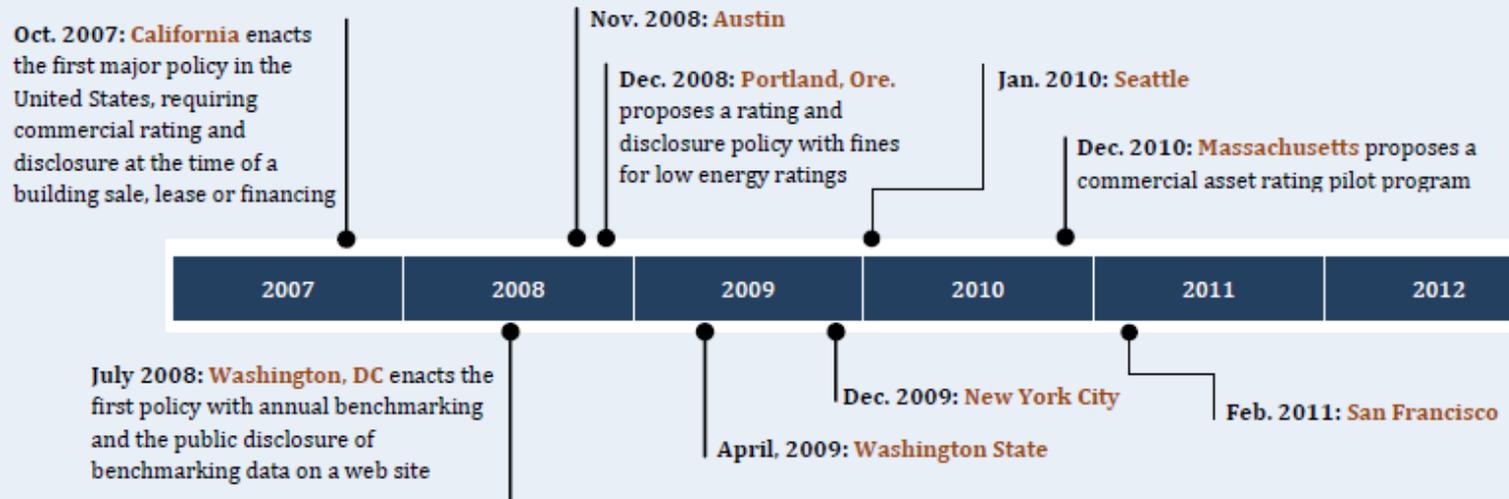
# Building Labeling History



## International Commercial Rating and Disclosure Policy: 1996 - Present

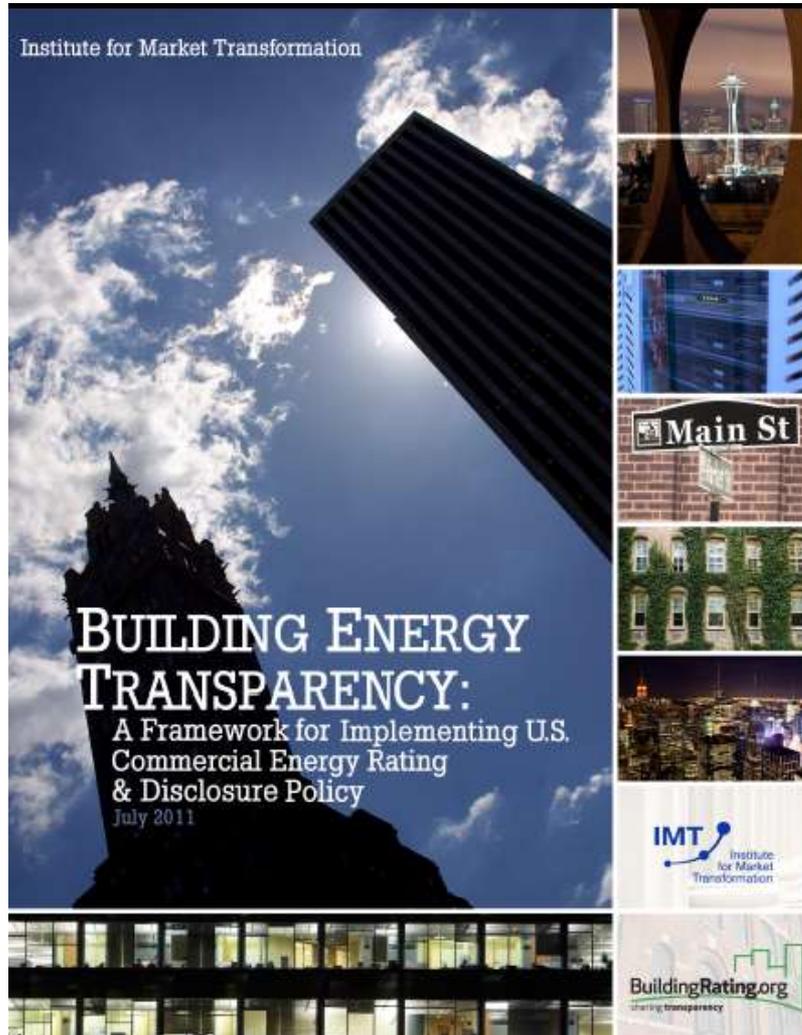


## U.S. Commercial Rating and Disclosure Policy 2007 - Present



# IMT's Commercial Report

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# C&I Terms & Concepts

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- **Benchmarking:** Process of comparing building energy performance against a baseline and generating performance metrics.
- **Portfolio Manager:** Building energy rating tool administered by EPA that generates energy performance metrics for commercial and multifamily building types.

# What is “Portfolio Manager”?

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- Free, web-based tool for benchmarking existing non-residential and multifamily buildings
- Provides benchmarks for all commercial buildings, including: ENERGY STAR energy performance score (1 to 100) for eligible buildings
- Normalized energy use intensities (EUI) for all buildings
  - EUI = a measurement of the energy consumed by a building relative to its size
- Facilitates applications for ENERGY STAR certification and Leaders recognition (top 25% in each building class)

# U.S. Commercial Rating & Disclosure Summary

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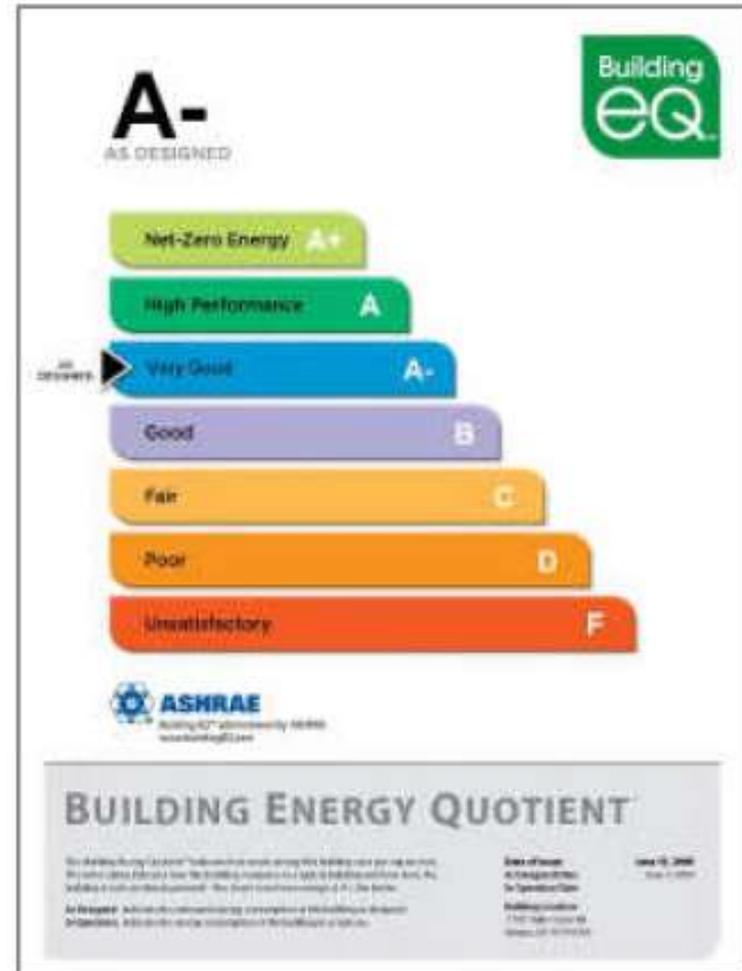
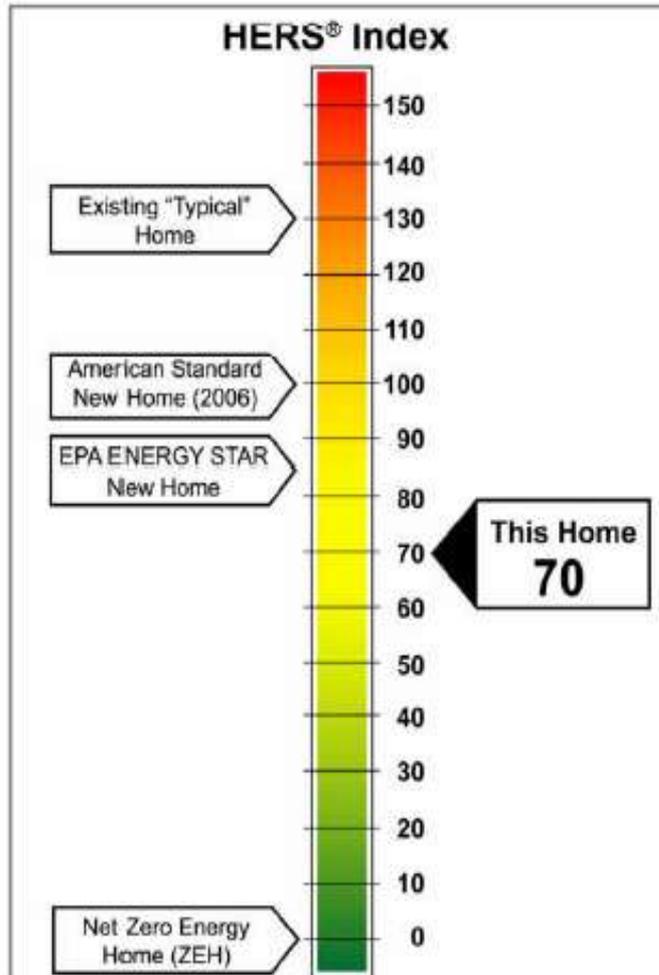
Jurisdiction	Benchmarking (Building Type and Size)		Disclosure					
	Non-residential	Multi-family	On public web site	To local government	To tenants	To transactional counterparties		
						Sale	Lease	Financing
Austin	10k SF+	-	-	✓	-	✓	-	-
California*	1k SF+	-	-	✓	-	✓	✓	✓
District of Columbia	50k SF+	50k SF+	✓	✓	-	-	-	-
New York City	50k SF+	50k SF+	✓	✓	-	-	-	-
San Francisco	10k SF+	-	✓	✓	✓	-	-	-
Seattle	10k SF+	5+ units	-	✓	✓	✓	✓	✓
Washington	10k SF+	-	-	-	-	✓	✓	✓

**Table 1:** U.S. Rating and Disclosure Policy Summary

\*Requirements subject to change by the California Energy Commission



# Some U.S. Options





# ENERGY PERFORMANCE SCORE

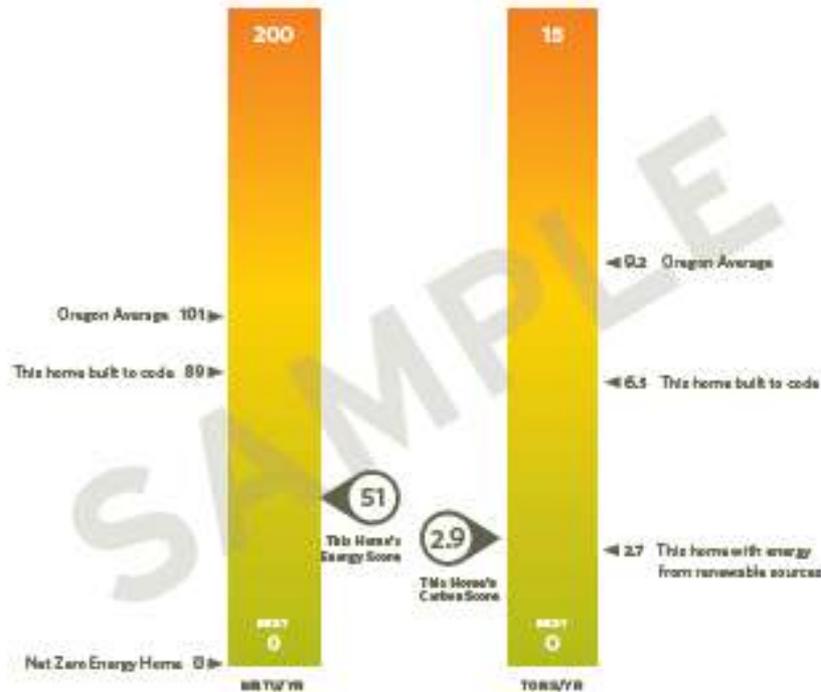
Independent assessment of energy consumption and carbon emissions.

## ENERGY CONSUMPTION

Measured in million BTU per year (MMBTU/yr).  
A million BTU = 293 kWh or 10 therms.

## CARBON EMISSIONS

Measured in tons of carbon dioxide per year (Tons/yr).  
One ton = 3,000 miles driven by one car (typical 21 mpg car).



REPORT FOR: 12345 Example Road, Portland, OR 97217

ISSUE DATE:  
02-01-2010

CONDITIONED FLOOR AREA  
(SQ. FEET):  
2,000

ESTIMATED ANNUAL  
ENERGY USAGE:

Electric (kWh): 512  
Natural gas (Therms): 401

IDENTIFICATION #:  
123456

TYPE OF  
Single Family

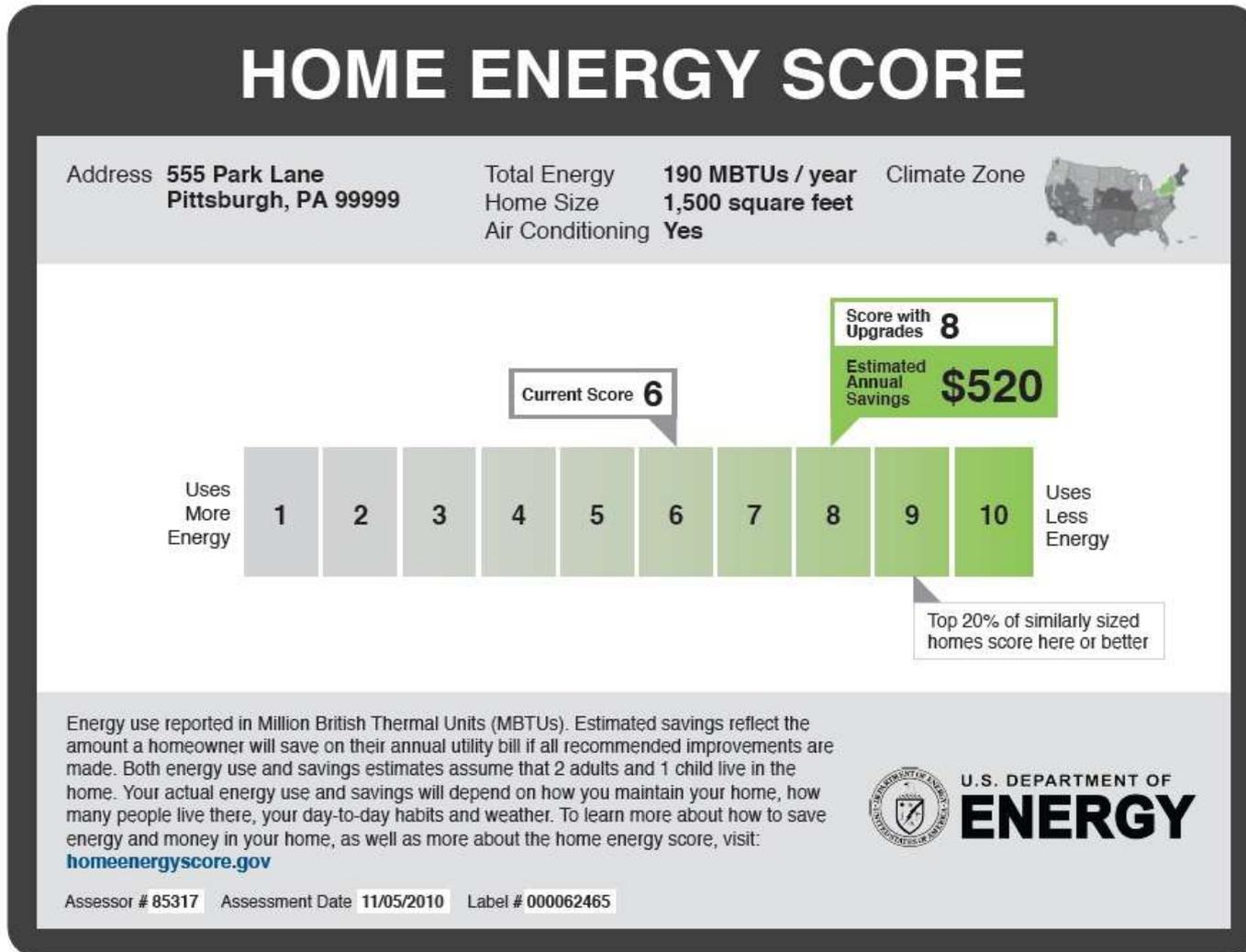
ESTIMATED AVERAGE  
ANNUAL ENERGY COST\*:

**\$598**  
monthly average: **\$50**  
\* Actual energy cost may vary.

The EPS is brought to you by Energy Trust of Oregon. Energy Trust makes it easy for homes to identify ways to use energy more efficiently. We provide cash incentives for everything from energy-saving products to insulation to solar energy systems.

For more information visit [www.energytrust.org/eps](http://www.energytrust.org/eps).

# DOE's New Home Energy Score



# Home Energy Rating Certificate

Hinesburg, VT 05461



**5 Stars Plus  
Verified Condition**

## Uniform Energy Rating System

1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-401	400-301	300-251	250-201	200-151	150-101	100-91	90-86	85-71	70-0

## Energy Efficient

HERS Index: **55**

### General Information

Conditioned Area: 2146 sq. ft. House Type: Single-family detached  
 Conditioned Volume: 15473 cubic ft. Foundation: Unconditioned basement  
 Bedrooms: 3

### Mechanical Systems Features

Heating: Fuel-fired hydronic distribution, Propane, 92.0 AFUE.  
 Water Heating: Integrated, Propane, 0.85 EF, 80.0 Gal.

Duct Leakage to Outside: NA  
 Ventilation System: Exhaust Only: 169 cfm, 54.0 watts.  
 Programmable Thermostat: Heating: Yes Cooling: No

### Building Shell Features

Ceiling Flat: R-37 Exposed Floor: R-39, R-0  
 Vaulted Ceiling: NA Window Type: U:0.35, SHGC:0.30  
 Above Grade Walls: R-19 Infiltration:  
 Foundation Walls: R-10.0 Rate: Htg: 830 Clg: 830 CFM50  
 Slab: None Method: Blower door test

### Lights and Appliance Features

Percent Fluorescent Pin-Based: 70.00 Clothes Dryer Fuel: Electric  
 Percent Fluorescent CFL: 0.00 Range/Oven Fuel: Propane  
 Refrigerator (kWh/yr): 460.00 Ceiling Fan (cfm/Watt): 0.00  
 Dishwasher Energy Factor: 0.66

The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

**REM Rate - Residential Energy Analysis and Rating Software v12.5 Vermont**

This information does not constitute any warranty of energy cost or savings.  
 © 1985-2008 Architectural Energy Corporation, Boulder, Colorado.

Rating Number: 6038J685  
 Export Build Run No: 13723  
 Certified Energy Rater: Sara Davis  
 Rating Date: December 15, 2008  
 Rating Ordered For: [REDACTED]

### Estimated Annual Energy Cost

Use	Verified Condition		
	MMBtu	Cost	Percent
Heating	71.7	\$2276	67%
Cooling	0	\$0	0%
Hot Water	3.9	\$125	4%
Lights/Appliances	22.6	\$668	26%
Photovoltaics	-0.0	\$-0	-0%
Service Charges		\$119	4%
<b>Total</b>		<b>\$3389</b>	<b>100%</b>

**This home meets or exceeds the minimum**

**criteria for all of the following:**

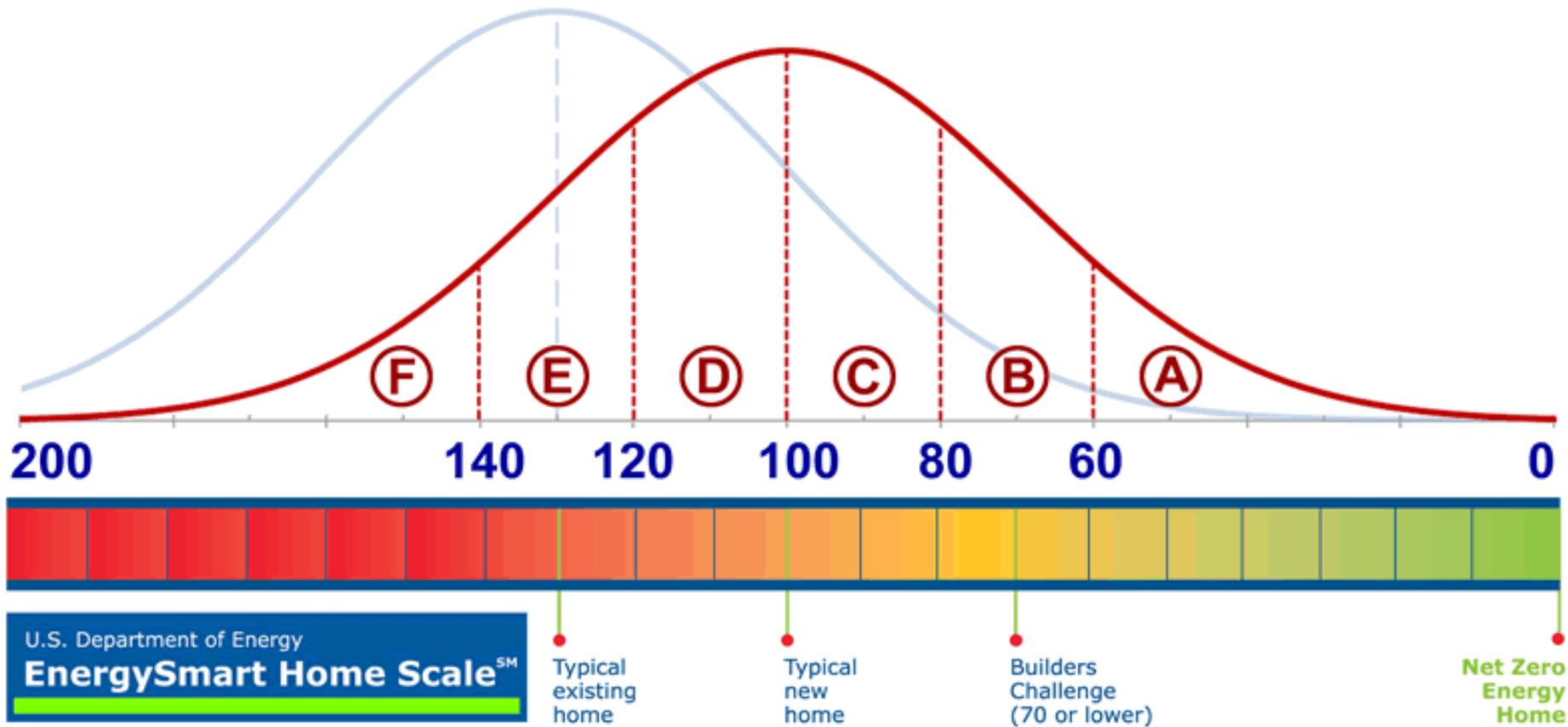
- Federal Energy Policy Act, 2005\*
- Vermont Energy Star Homes Criteria\*
- Vermont Residential Energy Code\*

\* Compliance with criteria for this program is determined by the rater.

Vermont Energy Investment Corp.  
 255 South Champlain St.  
 Burlington, VT 05401  
 800-639-6069  
 Fax 802-658-1643  
 www.veic.org



# Less Granular HERS Concept



# Vermont's Experience & Infrastructure

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- Home Energy Rating Systems (HERS)
  - Started Energy Rated Homes of Vermont in 1987
  - Board director of RESNET (national HERS standards-setting organization) since its inception in 1995 ([www.resnet.us](http://www.resnet.us))
  - Basis for ENERGY STAR Homes, Green Building Standards (LEED, NAHB...)
- Developed and ran Energy Improvement Mortgage programs in Vermont through the 90s with the VHFA, FHA, VA, Freddie, Fannie etc.
- Building Performance Institute (BPI) Certification
  - 70+ certified contractors & businesses
  - Statewide presence of energy professionals
  - Audit and improvement work completion capability and capacity

## Q&amp;A

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